Resources at Risk for BP Whiting Refinery, Whiting, IN

I. Spill Source Information

This report was prepared at 0945 EDT on 25 March 2014. A release of oil near the BP Whiting refinery's cooling water outfall in Whiting, IN was reported. BP has reported the product to be "No. 12 crude oil", however the actual and worst-case discharge volumes are not known.

II. Geographic Region Covered

This report covers portions of the western and southern coasts of Southern Lake Michigan from Chicago south and east to the Indiana Dunes National Lakeshore. This area does not necessarily correspond to actual or potential oil locations. Consult other Hotline reports for oil location information.

III. Expected Behavior of the Spilled Oil

The fate and behavior of a spill of crude oil will depend on the release conditions and the type of crude. The oil type was reported as a No. 12 crude oil. If the oil is viscous, very little is likely to mix into the water column. It can form thick streamers or, under strong wind conditions, break into patches and tarballs. The soluble fraction in crude oil contains some of the more acutely toxic components; heavy crudes will have lower amounts of these components.

For a surface release of fresh oil, it expected that the oil will form extensive slicks that would be subject to evaporation, emulsification, and other weathering processes. When stranded on the shoreline, the oil can coat animals and shoreline habitats. Direct mortality rates can be high for waterfowl, especially where populations are concentrated in small areas, such as during bird migrations. Shoreline cleanup can be very effective, particularly soon after the spill before the oil weathers, becoming stickier and even more viscous. If the stranded oil is relatively fresh it will readily penetrate porous sediments. Over time, the floating oil will weather and become more viscous.

Depending on the extent of ice or snow cover on and adjacent to the shoreline, the oil may not come in direct contact with shoreline sediments. However, the snow and ice can act as a permeable layer over the shoreline where oil can penetrate and persist. Black oil in snow can cause it to melt allowing the oil to spread vertically and horizontally; thus, it could reach the shoreline substrate.

IV. Shoreline Resources at Risk

Shorelines along the Indiana Harbor and Indiana Canal are composed of sheltered, solid man-made structures, riprap, mixed sand and gravel beaches, and exposed, solid man-made structures. Southeast of the release site from Buffington Harbor east to Gary Harbor the shorelines are primarily exposed, solid man-made structures and riprap. The shoreline along Indiana Dunes National Lakeshore is sand beach. Shorelines north of the release site towards Chicago are composed of exposed solid man-made structures and riprap with sheltered solid man-made structures in canals with pocket sand and gravel beaches and sand beaches.

Solid man-made structures are mostly impermeable and the oil will likely form a band or "bath-tub" ring at the water line. The oil may penetrate into the crevices and debris trapped in riprap or other porous, manmade structures, be difficult to remove, and result in chronic sheening.

On sand and gravel beaches, oil may form a band on the substrate at the waterline, whereas

heavy accumulations could penetrate into the sediments.

V. Biological Resources at Risk

State (Illinois (IL) and Indiana (IN)) and Federal Threatened (T), Endangered (E) and Species of Special Concern (SSC)

Nearshore areas are important foraging locations for migratory common tern (IL SE) and Forster's tern (IL SE) beginning in April. Migratory raptors, including bald eagle (IN SSC), osprey (IL SE), and red-shouldered hawk (IN SSC) use these areas (rare to uncommon) in the spring.

Other Birds

Birds potentially present along the Indiana Dunes National Lakeshore, and elsewhere in Lake Michigan (either on water for diving birds, ducks, and other waterfowl or beaches/dunes for shorebirds), at this time of year include:

- Red-throated and common loons (rare to uncommon), horned grebe (uncommon), double-crested cormorant (common);
- Waterfowl: Canada goose (common), mute swan (common), American black duck (common), mallard (common), canvasback (uncommon), redhead (common), ring-necked duck (common), greater and lesser scaup (uncommon to common), white-winged scoter (rare), bufflehead (common), common goldeneye (common), common merganser (uncommon), red-breasted merganser (abundant), ruddy duck (uncommon), American coot (abundant);
- Several species of raptors;
- Shorebirds: black bellied plover (uncommon), semipalmated plover (common), killdeer (common), willet (rare), ruddy turnstone (uncommon), sanderling (rare), semipalmated sandpiper (uncommon), least sandpiper (common), white-rumped sandpiper (uncommon), dunlin (uncommon), stilt sandpiper (rare); gulls, and terns.
- Least bittern (rare), great blue heron (abundant), and green heron (common) may be nesting in National Park marshes later in the spring and summer.

Waterfowl, wading birds, gulls, terns, shorebirds, and raptors can be severely impacted by oil in some cases. Waterfowl and wading birds may be directly oiled and can become oiled on the upper body and feathers by coming in contact with oiled vegetation or wrack. Gulls and terns may be oiled while capturing fish. Direct oiling of birds reduces the buoyancy, water repellency, and insulation provided by feathers, and may result in death by drowning or hypothermia. Preening of oiled feathers may also result in ingestion of oil resulting in irritation, sickness, or death. Oil brought back to the nests by adult birds may kill or injure eggs and young birds.

Fish

Lake Michigan is home to almost 100 species of fish. The lakeshore and adjacent rivers support important recreational fisheries.

Brown trout and coho salmon may be present at Gary Harbor. Brown trout and rainbow smelt (spawning March-May) may be present near Buffington Harbor and just south of Indiana

Harbor. Rainbow smelt and rainbow trout may be spawning along shore and in harbors north of the release area.

Species present in Lake Michigan at this time of year include: alewife, black crappie, brown trout, carp, Chinook salmon, coho salmon, emerald shiner, johnny darter, largemouth bass, pumpkinseed, rainbow smelt, rainbow trout, smallmouth bass, spottail shiner, white sucker, and yellow perch.

Mouths of rivers are spawning/aggregation hotspots and support higher diversity of species, such as shiners, trout, smelt, bass, pike, catfish, sunfish, and perches. Many fish spawn seasonally in nearshore or upstream areas, typically starting in mid-late spring, summer, or fall.

Localized fish kills could occur if oil accumulated in shallow, sheltered areas with low dilution rates, or if oil were mixed into the water column. There may be some mortality of larval and juvenile fish in shallow water areas if the oil accumulates. Certain species (e.g., salmon, trout) are often highly sensitive to environmental perturbations, such as oiled gravel in spawning areas. If sediments were mixed with oil in the water column due to wave action impacts are possible.

Plants

Endangered and threatened plant species occur in the Indiana National Lakeshore, including the federally threatened Pitcher's thistle. Care should be taken to avoid listed plant species on NPS lands.

Human-Use Resources

Numerous water intakes and marinas occur near Indiana Harbor and within the vicinity of the release site.

Management Areas

Indiana Dunes National Lakeshore is a National Park Service land of high concern in the vicinity of the release site.